

# KingFiber<sup>®</sup> CW System

**Heavy duty carbon fiber reinforced polymer wrap structural strengthening system.**

## DESCRIPTION

KingFiber CW System is a set of externally bonded carbon Fiber texture products along with resin products that enable site installation of the CFRP structural strengthening system on concrete, masonry or timber.

## APPLICATIONS

To strengthen structures where flexural and shear reinforcement is required for:

- ▣ Increasing loading capacity.
- ▣ Complying with standards, regulations, specifications and design philosophies.
- ▣ Satisfying structure utilization requirements.
- ▣ Structural repairs.
- ▣ Protecting structures against natural disasters.

## ADVANTAGES

- ▣ Thin system with application in layers (max of 3 layers).
- ▣ Flexible surface geometry accommodation.
- ▣ No corrosion and resistance to external factors.
- ▣ Thixotropic solvent free impregnation resin for easy use.
- ▣ Multifunctional use as bending or shear reinforcement.

## STANDARDS

KingFiber CW designs are conducted as per ACI 440, FIB 14, and ISIS # 3, 4, 5.

## METHOD OF USE

### Substrate Preparation

All substrates shall be free from oil, grease or any contaminants. It is recommended to blast clean substrates and clean from all debris or dust. Substrate shall be dry with a maximum moisture content of 4% and should be a minimum of 28 days old. The temperature application range is 10 - 35°C for substrate and ambient temperatures. Dew point of the substrate should be taken into consideration. All corners receiving the fabric shall be rounded to a minimum radius of 10 - 20 mm depending on fabric type. The bond surface shall be even and free from irregularities, pinholes or formwork marks. Fill all pinholes and smooth irregularities using a twin pack epoxy putty and leveling mortar such as KingRep EP10.

Adhesion of the impregnation resin values shall not fall below 1.5 N/mm<sup>2</sup>.

## PRIMING

Prepared surfaces should be primed using KingRep CW Primer. The primer should be applied by rollers at the rate of 0.25 - 0.30 kg/m<sup>2</sup> and allowed to cure for 24 hours.

## MIXING OF KINGREP CP20 (IMPREGNATION/ENCAPSULATING REINS)

To ensure proper mixing, a mechanically powered mixer or drill fitted with a suitable paddle should be used.

Entire contents of the base and hardener should be poured into a suitable size container and mixed for 3 minutes.

Pot life monitoring is crucial, where working in hot weather, components can be cooled down prior to mixing.

## APPLICATION OF KINGFIBER CARBON WRAP

Apply the mixed KingRep CP20 to the prepared substrate using a brush or roller at a rate of 0.275 kg/m<sup>2</sup> depending on the roughness of the substrate. Within the open time of the adhesive resin, place the KingFiber CW fabric onto the resin in the required direction and carefully work the fabric into the resin using a plastic laminating roller until the resin is squeezed out through the fabric and should be rolled again to encapsulate resin impregnation.

Another coat of KingRep CP20 is applied over the impregnated fabric at the rate of 0.275 kg/m<sup>2</sup> so as to insure a complete tight and dense system.

When applying additional fabric layers; apply impregnation resin KingRep CP20 at a rate of 0.25 kg/m<sup>2</sup> on the first layer, wet on wet. If the application of the resin was not possible within the open time of the first application, a waiting period of 12 hours shall be observed prior to application of the second layer.

When overlapping is necessary, always overlap in the Fiber direction with a minimum overlapping distance of 100 mm. Further renders can be achieved by adding a covering layer of the impregnation resin at a rate of 0.25 kg/m<sup>2</sup> with quartz sand broadcast to work as the bonding medium for cementitious coatings. Always protect reinforcement from direct exposure to UV rays.

## CLEANING

KingRep CW Primer, KingRep CP20 and equipment can be cleaned by an industrial grade solvent.

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## PACKAGING

KingFiber CW is available by roll in plain card board box. KingRep CW Primer is available in 5 and 15 kg/sets. KingRep CP20 is available in 5 and 15 kg/sets.

## COVERAGE

KingRep CW Primer: 0.25 - 0.30 kg/m<sup>2</sup>/coat. KingRep: 0.55 kg/m<sup>2</sup>/layer for 2 coats.

## STORAGE

Shelf life is 1 year when stored under cover, out of direct sunlight and protected from extremes of temperature.

Failure to comply with the recommended storage conditions may result in premature deterioration of the product or packaging. For specific storage advice consult KingKrete's Technical Services Department.

## HEALTH AND SAFETY

As with all chemical products, care should be taken during use and storage to avoid contact with eyes, mouth, skin and foodstuffs. Treat splashes to eyes and skin immediately. If accidentally ingested, seek medical attention. Reseal containers after use. Use in well ventilated areas and avoid inhalation.

## NOTE

Field service, where provided, does not constitute supervisory responsibility. For additional information contact your local KingKrete representative. KingKrete Inc. reserves the right to have the true cause of any difficulty determined by accepted test methods.

## QUALITY AND CARE

All products originating from KingKrete's manufacturing facilities are manufactured under a management system independently certified to conform to the requirements of the quality standard ISO 9001.

\* Properties listed are based on laboratory-controlled tests.

® = Registered trademark of the KingKrete-Group in many countries.

Flexural E-Modulus: ASTM D790-99	> 2700 MPa
Tensile strength: BS 6319	> 25 MPa
Adhesive strength: (concrete failure)	> 3.5 MPa
Pot life:	40 - 90 min @ 25°C 20 - 50 min @ 35°C
Open time:	15 - 30 min
Sag flow:	3 - 5 min @ 35°C
Mixing ratio:	2:1
Mixed density:	≈ 1.1

## PROPERTIES FOR THE IMPREGNATION/ENCAPSULATING RESIN KINGREP CP20

Compressive strength: BS 6319	> 60 MPa
Heat deflection temperature: ASTM D648-98	> 55°C
Tensile elongation at break: BS EN 150527-3	3%
Flexural strength: BS 6319	> 30 MPa
Slant shear bond strength: (old/new concrete) AASHTO T-237-73	> 15 MPa
Colour: (Mixed)	Yellowish
Solids:	100%

## PROPERTIES FOR KINGREP CW PRIMER

Flexural E-Modulus:	> 3500 MPa
Shear strength:	> 25 MPa
Adhesive strength: (concrete failure)	> 1.5 MPa
Compressive strength:	> 50 MPa
Viscosity:	< 2000 cps @ 25°C
Application temperature:	5 - 35°C
Mixing ratio:	1:2.85
Solids:	100%
Mixed density:	1.1

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## TECHNICAL PROPERTIES

KingFiber CW: Fiber orientation is Off (Unidirectional)

Product	Fiber Area Weight	Design Thickness	Tensile Strength	Tensile E-Moduus	Elongation At Break	Fabric Length	Fabric Width
KingFiber CW150	150 g/m <sup>2</sup>	0.086 mm	4800 MPa	230 GPa	2.1%	100 m	0.5 m
KingFiber CW200	200 g/m <sup>2</sup>	0.111 mm	4800 MPa	230 GPa	2.1%	100 m	0.5 m
KingFiber CW230	230 g/m <sup>2</sup>	0.131 mm	4800 MPa	230 GPa	2.1%	100 m	0.5 m
KingFiber CW300	300 g/m <sup>2</sup>	0.166 mm	4800 MPa	230 GPa	2.1%	100 m	0.5 m
KingFiber CW450	450 g/m <sup>2</sup>	0.255 mm	4800 MPa	230 GPa	2.1%	50 m	0.5 m
KingFiber CW530	530 g/m <sup>2</sup>	0.293 mm	4800 MPa	230 GPa	2.1%	50 m	0.5 m
KingFiber CW610	600 g/m <sup>2</sup>	0.337 mm	4800 MPa	230 GPa	2.1%	50 m	0.5 m

### KKK-NA-02.2-FB-CWSystem-R3-2601

#### STATEMENT OF RESPONSIBILITY

The technical information and application advice given in this KingKrete Inc. publication are based on the present state of our best scientific and practical knowledge. As the information herein is of a general nature, no assumption can be made as to a product's suitability for a particular use or application and no warranty as to its accuracy, reliability or completeness either expressed or implied is given other than those required by law. The user is responsible for checking the suitability of products for their intended use.

#### NOTE

Field service where provided does not constitute supervisory responsibility. Suggestions made by KingKrete Inc. either orally or in writing may be followed, modified or rejected by the owner, engineer or contractor since they, and not KingKrete Inc. are responsible for carrying out procedures appropriate to a specific application.